

# PATENT ABSTRACTS OF JAPAN

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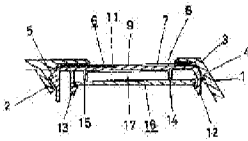
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(22)Date of filing : 30.06.1994 (72)Inventor : MAEDA TORU

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(54) OPERATION PANEL



(57)Abstract:

PURPOSE: To obtain a structure of an operation panel containing such a display device as a liquid crystal display(LCD), that has excellent appearance, prevents dust and water from entering, and does not cause such problems as the increased number of parts and the complicated shape of a body case.

CONSTITUTION: An operation panel includes a transparent resin unit case 6, and its body case 3 is provided with a window 8 that the front of the unit case 6 faces. A display device is mounted on a printed board, and is held on the rear side of the unit case 6. No opening is formed in areas that a display device of a large display area, such as LCD 17, faces. The front of the unit case 6 is covered

with an opaque layer, except the front part of the display device, such as LCD 17 and LED. The opaque layer is composed of a print layer printed in opaque ink on the front of the unit case; a surface sheet 7 provided with such a print layer; an opaque resin film having a cut-out window in a position opposed to the display device 17; a top cover; and so on.

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## LEGAL STATUS

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## CLAIMS

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### [Claim(s)]

[Claim 1] Unit case made of transparence resin which intercepts the front face of the big display (17) of the screen product mounted in the printed circuit board (16) (6) It has. body case (3) \*\*\*\* -- unit case (6) the part to face -- aperture (8) It is prepared. Display mounted in the printed circuit board (16) (17 18) Unit case of the part except a front face (6) In a front face, it is an opaque zone (7, 25, 32). Control panel characterized by being installed.

[Claim 2] Unit case (6) It is the mold goods of a transparent plastic and is a display (17 18). The mounted printed circuit board (16) is a unit case (6). It is held and is a unit case (6). Body case (3) Control panel according to claim 1 characterized by being held.

[Claim 3] Unit case (6) It is formed with a transparence plastic sheet and is a unit case (6). And display (17 18) The mounted printed circuit board (16) is a body case (3). Control panel according to claim 1 characterized by being held.

[Claim 4] The control panel according to claim 2 or 3 currently formed by the opaque web material which prepared the notching aperture (27) in the part which an opaque zone (25) faces the front face of the big display (17) of a screen product.

[Claim 5] The switch (22) is mounted in the printed circuit board (16), and it is a unit case (6). Control panel according to claim 4 which equips with opening (24) the part which counters this switch (22), and is characterized by carrying out \*\* arrival of this opening with the surface sheet (7 25).

[Claim 6] Body case (3) It is equipped with top covering (32) which can be freely opened and closed on the top face of a control-panel wearing part, and \*\* arrival of this top covering (32) is carried out to the front face of a unit case (6), and it is

a display (17 18). It is an aperture (33 34) to the part which attends a front face.  
Control panel according to claim 2 or 3 characterized by having.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to suitable structure especially about the structure of the control panel equipped with displays, such as a liquid crystal display panel (henceforth "LCD"), as a control panel prepared in business machines, such as a copying machine, a printer, and facsimile apparatus.

[0002]

[Description of the Prior Art] A control panel is prepared in a part of the case, and displays, such as LCD for displaying a condition, operating procedure, etc. of a device on the control panel and light emitting diode (henceforth "LED"), are prepared in business machines, such as a copying machine and a computer peripheral device.

[0003] Since it being necessary that such a control panel is prepared in some comparatively narrow fields of a body case, LCD, LED, etc. being mounted in the

printed circuit board with those driver components, switches, etc. and to make a display into the structure which can be clearly checked by looking from the outside, and a control panel are places stared most, they must also make goodness of a design (appearance) the structure in consideration of an important thing etc.

[0004] Drawing 6 and drawing 7 show the example of the conventional structure of a control panel. What was shown in drawing 6 and 7 is carrying out unitization of the control panel in consideration of the facilities of manufacture and an assembly. LCD17 and LED18 which are an indicating equipment are mounted in the printed circuit board 16 with the switch 22 etc. The printed circuit board 16 is pinched by strikes 14 and 15 and pawls 12 and 13, and is held at the unit case 6. Openings 51, 21, and 24 are formed in the part which the unit cases 6 are opaque synthetic-resin mold goods, and LCD17, LED18, and a switch 22 face. The keytop 23 is fitted in the opening 24 which a switch 22 faces. The surface sheet 52 which consists of transparence plastic film is stuck on the top face of the unit case 6. A control panel is assembled as a unit and mounted in the body case 3 by inserting in among the collars 53 and 54 and pawls 1 and 2 which were formed in the body case.

[0005] The opening 51 which LCD faces is closed by the surface sheet 52 with the structure of drawing 6 . However, since the screen product is [ LCD17 ] large unlike LED18 grade, also in opening 51, it becomes large, and in this opening 51 part, it slackens, or the surface sheet 52 swells up, and, as for such structure, appearance gets very bad.

[0006] On the other hand, the structure shown in drawing 7 is what formed the notching aperture 55 in the surface sheet 52 of opening 51 part of LCD, and is the structure where LCD17 was exposed on the top face of a control panel. In the case of this structure, although the badness of the appearance on appearance is not produced, invasion of the dust into a control panel or water poses a problem.

[0007] They is drawing 6 and the structure which has solved the problem of the structure shown by 7, and drawing 8 is the structure which pasted the medial

surface of the unit case 6 and formed the transparence plate 56 in the rear-face side (LCD side) of the opening 51 concerned while it forms the notching aperture 55 in the surface sheet 52 of opening 51 part of LCD. Since according to the structure of this drawing 8 the surface sheet 52 does not exist in opening 51 part of LCD, the fall of the appearance by the slack of a surface sheet is not produced and the transparence plate 56 is stuck inside opening 51, the problem of invasion of the dust from opening 51 or water is not produced, either.

[0008] In addition, since the opening area is small, the opening 51 of LED does not produce the problem that appearance falls according to slack etc., even if covered with the surface sheet 52.

[0009]

[Problem(s) to be Solved by the Invention] However, components mark of structure of drawing 8 increase and the manufacture man day and the number of erectors of components increase.

[0010] In order to avoid the rise of the cost by the increment in components mark, structure as shown in drawing 9 is also adopted. The structure of drawing 9 is what communalized the body case and the unit case, it forms the apertures 57, 58, and 59 LCD17, LED18, and for switch 22 in the body case 3, equips the transparence plate 56 and the surface sheet 52 with them directly, and also fixes the printed circuit board 16 to the body case 3 with screws 61 and 62. In order according to the structure of this drawing 9 to have to deal with a big body case in that many small apertures 57, 58, and 59 need to be processed for the big body case 3, and the assembly of a small control panel although one components mark decrease compared with the structure of drawing 8 since a unit case is also omissible, new problems, like assembly operation becomes complicated arise.

[0011] This invention was not made for the purpose of solving such various problems of equipment conventionally, and makes it the technical problem to acquire the structure of the control panel which problems, such as complication of deterioration of exterior quality, invasion of the dust into a control panel or

water, increase of components mark, and the configuration of a body case, do not produce.

[0012]

[Means for Solving the Problem] The control panel of this invention is equipped with the unit case 6 which consists of transparence resin mold goods or a transparence resin plate. The aperture 8 which the front face of the unit case 6 faces is formed in the control-panel applied part of the body case 3. The display of LCD17 or LED18 grade is mounted in the printed circuit board 16, and is held in the unit case 6 or the body case 3 at the tooth-back side of the unit case 6. Opening is not prepared in the part which the big display of screen products, such as LCD17 of the unit case 6, faces. Except for the front part of displays, such as LCD17 and LED18, \*\* arrival of the opaque zone is carried out to the front face of the unit case 6. This opaque zone can be formed with the transparent surface sheet 7 which has the printing layer of the opaque ink printed in the front face of a unit case, and such a printing layer, the surface sheet 25 which consists of an opaque resin film which formed the notching apertures 26 and 27 in the opposite section of displays 17 and 18, or the top covering 32 which becomes the part which counters displays 17 and 18 from the opaque resin plate which formed apertures 33 and 34.

[0013]

[Function] Since what is necessary is not to prepare the aperture of small a large number in the location corresponding to the indicating equipments 17 and 18 or switch 22 on the printed circuit board 16 at the body case 3, and just to form the big aperture 8 into the part which the front face of the unit case 6 faces the body case 3 by establishing the unit case 6, manufacture of a body case and the assembly of a control panel are easy (desirable operation of conventionally as opposed to structure as shown in drawing 9 ).

[0014] The body case 3 is formed by the mold goods or the plate of a transparent plastic. The \*\* arrival of the field to make it opaque [ the front face of a control panel ] is carried out with top covering 32 which consists of an opaque plate

prepared in a front face to the pan of the surface sheet 7 (the 1st example) which consists of a bright film which performed opaque printing to the front face of the unit case 6 which consists of this transparence resin, the surface sheet 25 (the 2nd example) which becomes the front part of displays 17 and 18 from the opaque film which formed the notching apertures 33 and 34, or a body case 3. Therefore, with the structure of this invention, the function attained with the surface sheet 52 in the conventional structure, the unit case 6, and the transparence plate 56 of drawing 8 is realized by two members of the unit case 6 and opaque zones 7, 25, and 32, and components mark can be lessened compared with the structure of drawing 8 .

[0015] Moreover, since the front face of the big display of screen products, such as LCD17, is covered in the unit case 6 which is the mold goods or the plate of transparence resin, even when the surface sheet 7 is stuck on the front face, it is not generated and the problem of the slack of a surface sheet does not produce invasion of the dust into a control panel, or water, either (desirable operation over drawing 6 and the conventional structure of 7).

[0016] Since the structure of holding the printed circuit board 16 in this unit case by using the unit case 6 as mold goods can assemble a control panel as a unit, the assembly of equipment becomes easy. Manufacture of a unit case is easy for what formed the unit case by the plate on the other hand. The structure formed with the surface sheets 7 and 25 of the opaque film which formed the notching apertures 26 and 27 in the front face of the bright film which performed opaque printing for the opaque zone, or a display is easy to form various kinds of displays by printing on the front face of a control panel, and when switch 22 grade is prepared in a control panel, it can close the opening 24 which this switch faces with the surface sheets 7 and 25. Since the structure of this invention can form an opaque zone with this top covering when the top covering 32 which can be freely opened and closed in the front face of a control panel is formed, its reduction effectiveness of components mark is still larger.

[0017]



[Example] It is the sectional view of a part in which drawing 1 and drawing 2 showed the 1st example of this invention, drawing 1 established the sectional view of a LCD part, and drawing 2 established a switching device and LED. The control panel of this example is equipped with the body case 3 where it has two engagement pawls 1 and 2 which counter a medial surface, and the unit case 6 where it has the projections 4 and 5 which engage with said engagement pawl, and the surface sheet 7 which carried out opaque printing to the transparent synthetic-resin film partially is infixed among both 3 and 6.

[0018] The body cases 3 are opaque synthetic-resin mold goods, and the aperture 8 is formed in the part which the unit case 6 faces. A unit case is fabricated with transparent synthetic resin, and the LCD display 9 with low length is formed in the front face. The surface sheet 7 consists of a bright film which performed opaque printing except for the part which counters LED mentioned later, and the notching aperture 11 is formed in the center. Said LCD display is exposed from this notching aperture 11.

[0019] The maintenance pawl 12 formed in the opposite side of the engagement projection 4, this maintenance pawl, and the maintenance pawl 13 formed in the location which counters are formed in the rear face of the unit case 6, and two strikes 14 and 15 are formed near the inside of both the maintenance pawl. The printed circuit board 16 is in the condition of having made the front face contacting strikes 14 and 15, and the side side is grasped by the maintenance pawls 12 and 13.

[0020] LCD17, LED18, and a switching device 19 are mounted, and the front face of LCD17 separated few gaps in the front face of the printed circuit board 16 grasped in the unit case 6 from the rear face of the unit case 6, and has countered it. LED18 passes along the small opening 21 prepared in the unit case, and is located on the same flat surface as the front face of a unit case. The switching device 19 has the switch 22 and the keytop 23, and is located on the same flat surface as the front face of a unit case through the large-sized opening 24 by which this keytop 23 was formed in the unit case 6.

[0021] The assembly of the control panel of this example sags the maintenance pawls 12 and 13 of the unit case 6 in the direction of an aperture, inserts LED18 and a keytop 23 in openings 21 and 24, makes the front face of the printed circuit board 16 contact strikes 14 and 15, and returns the maintenance pawls 12 and 13. Next, the notching aperture 11 is doubled with the LCD display 9, the surface sheet 7 is put on the unit case 6, and it is carried out by carrying out fitting of the engagement projections 4 and 5 of a unit case to the engagement pawls 1 and 2 of a body case. Since the control panel of this example can carry out unitization of the printed circuit board and the unit case, it has the description that it can assemble easily.

[0022] Drawing 3 shows the 2nd example of this invention. The unit case 6 of the control panel of this example is formed with the transparence plastic sheet, and the surface sheet 25 is formed by the opaque web material which has two notching apertures 26 and 27. The body cases 3 are opaque synthetic-resin mold goods, and the aperture 8 is formed in the part which the unit case 6 faces. The maintenance pawls 12 and 13 are formed in the inferior surface of tongue of the body case 3, and the engagement pawl shown in the 1st example is not formed in it. Strikes 14 and 15 are arranged between the maintenance pawls 12 and 13 and an aperture 8, and through tubes 28 and 29 are formed in the location corresponding to these strikes 14 and 15 in the side part of the unit case 6.

Although opening 24 is formed in the location corresponding to the keytop 23 of the switching device 19 mounted in the printed circuit board 16 by the unit case 6, opening is not prepared in the location corresponding to LED18. The unit case 6 and the printed circuit board 16 are distance detached building \*\*\*\*\* which does not contact LCD17 and LED18 with the spacer 31 which fixed on the front face of the printed circuit board 16.

[0023] The assembly of the control panel of this example carries the surface sheet 25 in the center of the unit case 6, inserts the through tubes 28 and 29 of the side side in strikes 14 and 15, and equips with a unit case. The surface sheet 25 is fixed between the body case 3 and the unit case 6. Next, as the

maintenance pawls 12 and 13 are opened, and LCD17 and LED18 correspond to the notching apertures 26 and 27 of the surface sheet 25 and a keytop 23 fits into opening 24, it is carried out by making the printed circuit board 16 hold by strikes 14 and 15 and the maintenance pawls 12 and 13. Although the control panel of this example cannot assemble the printed circuit board and a unit case as a unit, it has the advantage in which manufacture of a unit case becomes easy.

[0024] Drawing 4 and drawing 5 are what showed the 3rd example of this invention, and it is the sectional view of a part in which drawing 4 established the sectional view of the LCD section, and drawing 5 established LED and a switching device. The control panel of this example forms the top covering 32 which can be freely opened and closed in the body case 3. The top covering 32 is the mold goods of opaque synthetic resin, and has formed apertures 33, 34, and 35 in the location corresponding to LCD17, LED18, and a keytop 23, respectively. A step 36 is formed in the rear face of the aperture 33 corresponding to LCD, the bridge walls 37 and 38 which prevent optical diffusion of LED are formed in the rear face of the aperture 34 corresponding to LED, and the keytop 23 supported by the thin elastic piece 39 illustrated at the rear face of top covering is fitted in the aperture 35 corresponding to a keytop.

[0025] The body cases 3 are the mold goods of opaque synthetic resin, and the aperture 8 is formed in the part which the unit case 6 faces. The thick section 42 which has the engagement hollow 41 and a screw hole is formed in the medial surface of a body case. The unit case 6 is formed with the mold goods of transparent synthetic resin, and has the magnitude equivalent to the aperture 8 and the thick section 42 of a body case. Two protruding lines 43 and 44 which fit into the common-law marriage of the aperture 8 of a body case are formed in the front face (field by the side of top covering) of a unit case, and the hollows 45 and 46 which contain LCD17 and LED18 which were mounted in the printed circuit board 16 are established in the rear face. Furthermore, the opening 47 into which the switch 22 of a switching device fits loosely is formed in the unit case.

[0026] The assembly of the control panel of this example makes the hollows 45

and 46 and opening 47 of a unit case contain LCD17, LED18, and a switch 22. Screw screws 48 and 49 in the screw hole formed in the tooth back of protruding lines 43 and 44, and the printed circuit board 16 is fixed at the rear face of the unit case 6. While fitting the end of a unit case and the printed circuit board in the engagement hollow 41 of a body case and fitting the protruding lines 43 and 44 of a unit case into the common-law marriage of the aperture 8 of a body case It is carried out by screwing the other end of a unit case in the screw hole of the thick section 42 of a body case, and fixing with a screw 50. Under the present circumstances, fitting of the tooth back of the hollow 45 which contained LCD is carried out to the step 36 of top covering, fitting of the tooth back of the hollow 46 which contained LED is carried out among bridge walls 37 and 38, and a switch 22 is positioned under the keytop 23. Since this example covered the whole with top covering which can be opened and closed freely, it is good-looking.

[0027]

[Effect of the Invention] As mentioned above, according to the control panel of this invention, since it is not necessary to prepare a surface sheet in the opening part of big LCD of a screen product, exterior debasement by the slack of a surface sheet is not produced. And since the front face of LCD is covered in the transparent unit case, it can prevent that dust and water invade into a control panel. Furthermore, a transparency plate can become unnecessary and the mark of components can be decreased. Moreover, in the body case of the display panel of this invention, it can manufacture easily that what is necessary is just to prepare the aperture of the magnitude which a unit case faces. Since the opaque zone was installed in the unit case and the inside of a display panel was intercepted, various kinds of displays can be easily formed in the front face of a control panel by printing.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The sectional view of the LCD part of the 1st example

[Drawing 2] The sectional view of a part in which the switching device and LED of the 1st example were prepared

[Drawing 3] The 2nd example sectional view

[Drawing 4] The sectional view of the LCD part of the 3rd example

[Drawing 5] The sectional view of a part in which the switching device and LED of the 3rd example were prepared

[Drawing 6] The sectional view showing the 1st conventional structure

[Drawing 7] The sectional view showing the 2nd conventional structure

[Drawing 8] The decomposition sectional view showing the 3rd conventional structure

[Drawing 9] The decomposition sectional view showing the 4th conventional structure

[Description of Notations]

3 Body Case

6 Unit Case

7 Surface Sheet

8 Aperture

16 Printed Circuit Board

17 LCD

25 Surface Sheet  
27 Notching Aperture  
32 Top Covering

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[Translation done.]

\* NOTICES \*

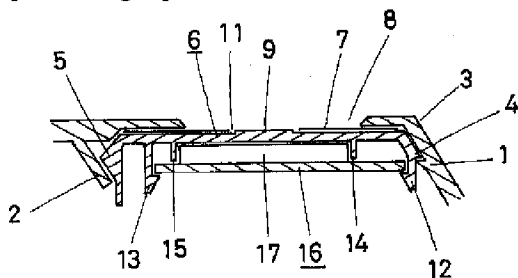
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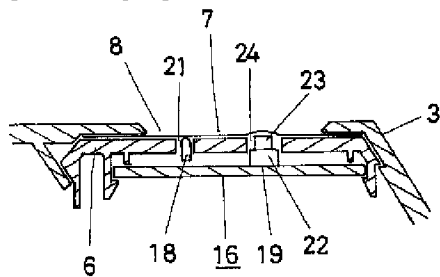
## DRAWINGS

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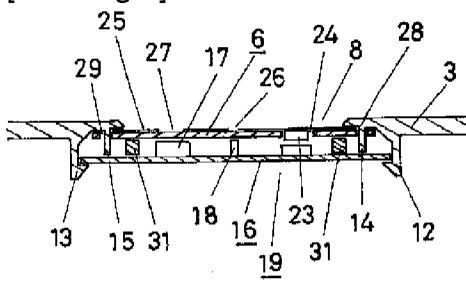
[Drawing 1]



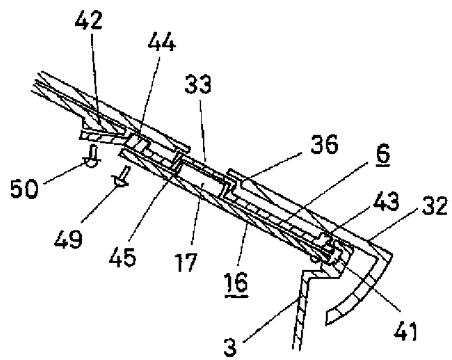
[Drawing 2]



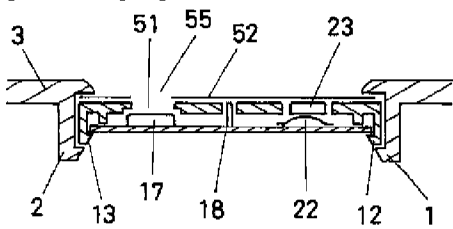
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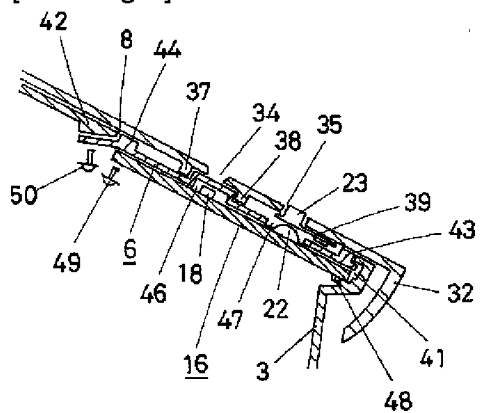
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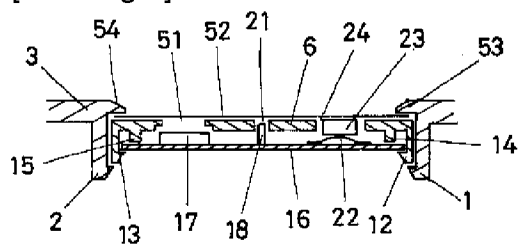
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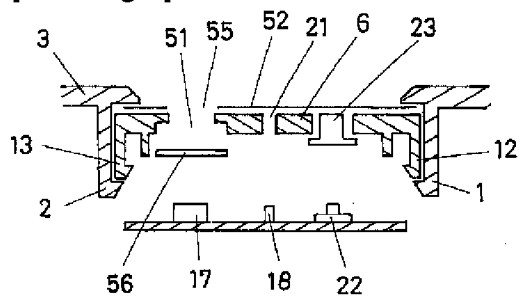
[Drawing 5]



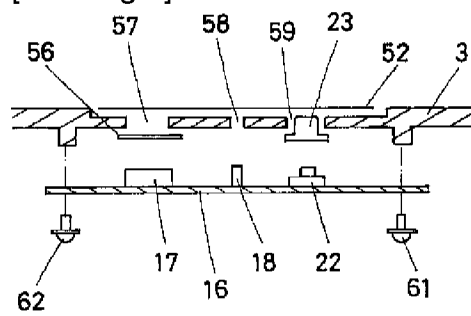
[Drawing 6]



[Drawing 8]



[Drawing 9]



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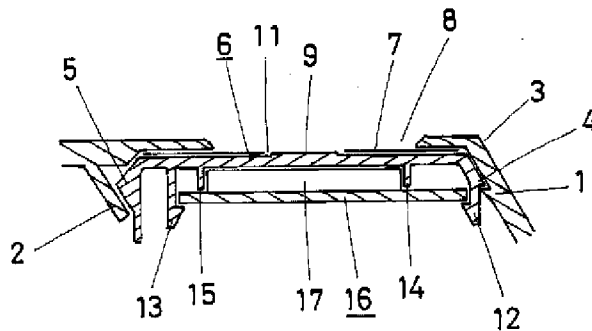
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(54)【発明の名称】 操作パネル

(57)【要約】

【目的】 液晶表示板 (L C D) 等の表示装置を備えた操作パネルの構造に関し、外観が優れ、ゴミや水の侵入が防止され、部品点数の増大や本体ケースの形状の複雑化などの問題が生じない操作パネルの構造を得ることである。

【構成】 透明樹脂製のユニットケース6を備え、本体ケース3にはユニットケース6の前面が臨む窓8が設けられる。表示装置はプリント板に実装されてユニットケース6の背面側に保持される。L C D 1 7などの表示面積の大きな表示装置が臨む部分には開口は設けられていない。ユニットケース6の前面にはL C D 1 7やL E D 1 8などの表示装置の前面部分を除いて不透明層が覆着される。この不透明層はユニットケースの前面に印刷した不透明インクの印刷層、そのような印刷層を設けた表面シート7、表示装置1 7、1 8の対向部に切欠窓2 6、2 7を設けた不透明樹脂フィルムやトップカバー3 2などによって形成される。



## 【特許請求の範囲】

【請求項1】 プリント板(16)に実装された表示面積の大きな表示装置(17)の前面を遮断する透明樹脂製のユニットケース(6)を備え、本体ケース(3)にはユニットケース(6)が臨む部分に窓(8)が設けられ、プリント板(16)に実装された表示装置(17, 18)の前面を除く部分のユニットケース(6)の前面には、不透明層(7, 25, 32)が添設されていることを特徴とする、操作パネル。

【請求項2】 ユニットケース(6)が透明プラスチックの成形品であり、表示装置(17, 18)を実装したプリント板(16)がユニットケース(6)で保持され、ユニットケース(6)が本体ケース(3)で保持されていることを特徴とする、請求項1記載の操作パネル。

【請求項3】 ユニットケース(6)が透明プラスチック板で形成され、ユニットケース(6)及び表示装置(17, 18)を実装したプリント板(16)が本体ケース(3)で保持されていることを特徴とする、請求項1記載の操作パネル。

【請求項4】 不透明層(25)が表示面積の大きな表示装置(17)の前面に臨む部分に切欠窓(27)を設けた不透明シート材で形成されている、請求項2または3記載の操作パネル。

【請求項5】 プリント板(16)にはスイッチ(22)が実装されており、ユニットケース(6)はこのスイッチ(22)に対向する部分に開口(24)を備えており、この開口が表面シート(7, 25)で覆着されていることを特徴とする、請求項4記載の操作パネル。

【請求項6】 本体ケース(3)の操作パネル装着部分の上面に開閉自在なトップカバー(32)が装着されており、このトップカバー(32)はユニットケース(6)の前面に覆着され、かつ表示装置(17, 18)の前面に臨む部分に窓(33, 34)を備えていることを特徴とする、請求項2または3記載の操作パネル。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 この発明は、液晶表示板（以下「LCD」と言う）等の表示装置を備えた操作パネルの構造に関するもので、たとえば複写機、プリンタ、ファクシミリ装置などの事務機器に設ける操作パネルとして特に好適な構造に関するものである。

## 【0002】

【従来の技術】 複写機やコンピュータ周辺装置などの事務機器には、その筐体の一部に操作パネルが設けられ、その操作パネルには機器の状態や操作手順等を表示するためのLCDや発光ダイオード（以下「LED」と言う）などの表示装置が設けられる。

【0003】 このような操作パネルは、本体ケースの一部の比較的狭い領域に設けられること、LCDやLEDなどはそれらのドライバ素子やスイッチなどとともにプリント板に実装されていること、表示装置は外部から明

瞭に視認できる構造とする必要があること、操作パネルは最も注視される所であるから、デザイン（見栄え）の良さも重要であることなどを考慮した構造としなければならない。

【0004】 図6及び図7は操作パネルの従来構造の例を示したものである。図6及び7に示したものは、製作及び組立ての便を考慮して操作パネルをユニット化している。表示装置であるLCD17及びLED18は、スイッチ22などとともにプリント板16に実装されている。プリント板16は受座14、15と爪12、13で挟持されてユニットケース6に保持されている。ユニットケース6は不透明な合成樹脂成形品で、LCD17及びLED18及びスイッチ22が臨む部分には開口51、21、24が設けてある。スイッチ22が臨む開口24にはキートップ23が嵌装されている。ユニットケース6の上面には透明プラスチックフィルムからなる表面シート52が貼付されている。操作パネルはユニットとして組み立てられ、本体ケースに設けた鏍53、54と爪1、2との間に嵌め込むことにより、本体ケース3に実装される。

【0005】 図6の構造ではLCDが臨む開口51が表面シート52で閉鎖されている。ところがこのような構造は、LCD17がLED18等と異なり表示面積が大きいので開口51も広くなり、表面シート52がこの開口51部分において弛んだり膨れ上がった見栄えが非常に悪くなる。

【0006】 これに対して図7に示した構造は、LCDの開口51部分の表面シート52に切欠窓55を設けたもので、LCD17を操作パネルの上面に露出させた構造である。この構造の場合はみかけ上の見栄えの悪さは生じないけれども、操作パネル内への塵埃や水の侵入が問題となる。

【0007】 図8は図6、7で示した構造の問題を改善した構造で、LCDの開口51部分の表面シート52に切欠窓55を設けるとともに、当該開口51の裏面側（LCD側）に透明板56をユニットケース6の内側面に接着して設けた構造である。この図8の構造によれば、LCDの開口51部分には表面シート52が存在しないから、表面シートの弛みによる見栄えの低下は生じず、また開口51の内側に透明板56が貼着されているので、開口51からのゴミや水の侵入の問題も生じない。

【0008】 なおLEDの開口51はその開口面積が小さいので、表面シート52で覆われていても弛み等によって見栄えが低下するという問題は生じない。

## 【0009】

【発明が解決しようとする課題】 しかし図8の構造は部品点数が多くなり、部品の製作工数や組立工数が増大する。

【0010】 部品点数の増加によるコストの上昇を避け

るため、図9に示すような構造も採用されている。図9の構造は本体ケースとユニットケースとを共通化したもので、本体ケース3にLCD17、LED18及びスイッチ22用の窓57、58、59を設け、透明板56や表面シート52に直接装着し、プリント板16も本体ケース3にネジ61、62で固定するようにしたものである。この図9の構造によれば、ユニットケースを省略することもできるから、図8の構造に比べて部品点数は1個減少するが、大きな本体ケース3に多数の小さな窓57、58、59の加工が必要であること、小さな操作パ

ネルの組立てに大きな本体ケースを取り扱わねばならないため、組立作業が煩雑になることなどの新たな問題が生ずる。

【0011】この発明は、このような従来装置の種々の問題を解決することを目的としてなされたもので、外観上の品質の低下、操作パネル内へのゴミや水の侵入、部品点数の増大、本体ケースの形状の複雑化などの問題が生じない操作パネルの構造を得ることを課題としている。

【0012】

【課題を解決するための手段】この発明の操作パネルは、透明樹脂成形品または透明樹脂板からなるユニットケース6を備えている。本体ケース3の操作パネル装着部には、ユニットケース6の前面が臨む窓8が設けられる。LCD17やLED18等の表示装置はプリント板16に実装され、ユニットケース6の背面側にユニットケース6または本体ケース3で保持される。ユニットケース6のLCD17などの表示面積の大きな表示装置が臨む部分には開口は設けられていない。ユニットケース6の前面にはLCD17やLED18などの表示装置の前面部分を除いて不透明層が覆着される。この不透明層は、ユニットケースの前面に印刷した不透明インクの印刷層、そのような印刷層を有する透明な表面シート7、表示装置17、18の対向部に切欠窓26、27を設けた不透明樹脂フィルムからなる表面シート25、あるいは表示装置17、18に対向する部分に窓33、34を設けた不透明樹脂板からなるトップカバー32などによって形成できる。

【0013】

【作用】ユニットケース6を設けることにより、本体ケース3にプリント板16上の表示装置17、18やスイッチ22に対応する位置に小さな多数の窓を設ける必要がなく、本体ケース3にはユニットケース6の前面が臨む部分に大きな窓8を設けておけばよいから、本体ケースの製作や操作パネルの組立てが容易である（図9に示すような従来構造に対する好ましい作用）。

【0014】本体ケース3は透明プラスチックの成形品または板材で形成される。操作パネルの前面の不透明としたい領域は、この透明樹脂からなるユニットケース6の前面に不透明印刷を施した透明フィルムからなる表面

シート7（第1実施例）、表示装置17、18の前面部分に切欠窓33、34を設けた不透明フィルムからなる表面シート25（第2実施例）、あるいは本体ケース3のさらに前面に設けられる不透明な板材よりなるトップカバー32などによって覆着される。従ってこの発明の構造では図8の従来構造における表面シート52、ユニットケース6及び透明板56で達成される機能を、ユニットケース6と不透明層7、25、32との2個の部材で実現しており、図8の構造に比べて部品点数を少なくできる。

【0015】またLCD17などの表示面積の大きな表示装置の前面は、透明樹脂の成形品または板材であるユニットケース6で覆われるので、その前面に表面シート7を貼着した場合でも、表面シートの弛みという問題は生ぜず、また操作パネル内への塵埃や水の侵入も生じない（図6、7の従来構造に対する好ましい作用）。

【0016】ユニットケース6を成形品として、このユニットケースでプリント板16を保持する構造は、操作パネルをユニットとして組み立てることが可能であるから、装置の組立てが簡単になる。一方ユニットケースを板材で形成したものは、ユニットケースの製作が容易である。不透明層を不透明印刷を施した透明フィルムや表示装置の前面に切欠窓26、27を設けた不透明フィルムの表面シート7、25で形成する構造は、操作パネルの表面に各種の表示を印刷によって形成するのが容易であり、また操作パネルにスイッチ22等が設けられる場合に、このスイッチが臨む開口24を表面シート7、25で閉鎖することができる。さらにこの発明の構造は操作パネルの前面に開閉自在なトップカバー32が設けられる場合には、このトップカバーによって不透明層を形成できるので、部品点数の低減効果が大きい。

【0017】

【実施例】図1および図2は本発明の第1実施例を示したものであり、図1はLCD部分の断面図、図2はスイッチ素子とLEDを設けた部分の断面図である。本実施例の操作パネルは、内側面に対向する二つの係合爪1、2を有する本体ケース3と、前記係合爪と係合する突起4、5を有するユニットケース6とを備えており、両者3、6の間には透明な合成樹脂フィルムに部分的に不透明印刷をした表面シート7が介装されている。

【0018】本体ケース3は不透明合成樹脂成形品であり、ユニットケース6が臨む部分に窓8が設けられている。ユニットケースは透明な合成樹脂で成形されたものであり、その表面に丈の低いLCD表示部9が設けられている。表面シート7は後述するLEDに対向する部分を除き不透明印刷を施した透明フィルムからなり、その中央に切欠窓11が設けられている。前記LCD表示部がこの切欠窓11から露出している。

【0019】ユニットケース6の裏面には係合突起4の反対側に形成された保持爪12とこの保持爪と対向する

位置に形成された保持爪13とが設けられており、両保持爪の内側近傍には二つの受座14、15が設けられている。プリント板16はその表面を受座14、15に当接させた状態で、その側辺を保持爪12、13で把持されている。

【0020】ユニットケース6で把持されたプリント板16の表面には、LCD17、LED18およびスイッチ素子19が実装されており、LCD17の表面はユニットケース6の裏面とわずかな間隙を隔てて対向している。LED18はユニットケースに設けられた小形の開口21を10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 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2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640

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【発明の効果】以上のように本発明の操作パネルによれば、表示面積の大きなLCDの開口部分に表面シートを設ける必要がないから、表面シートの弛みによる外観上の品質低下を生じない。しかもLCDの前面は透明なユニットケースにより遮蔽されているから、操作パネル内へ塵埃や水が侵入するのを防止することができる。更に、透明板が不要となり、部品の点数を減少させることができる。また、本発明の表示パネルの本体ケースには、ユニットケースが臨む大きさの窓を設けるだけでよく、簡単に製造することができる。ユニットケースに不透明層を添着して表示パネル内を遮断したので、操作パネルの表面に各種の表示を印刷によって容易に形成することができる。

【図面の簡単な説明】

【図1】第1実施例のLCD部分の断面図

【図2】第1実施例のスイッチ素子及びLEDを設けた部分の断面図

【図3】第2実施例断面図

【図4】第3実施例のLCD部分の断面図

【図5】第3実施例のスイッチ素子及びLEDを設けた部分の断面図

【図6】第1の従来構造を示す断面図

【図7】第2の従来構造を示す断面図

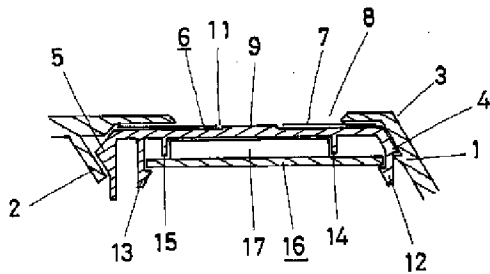
【図8】第3の従来構造を示す分解断面図

【図9】第4の従来構造を示す分解断面図

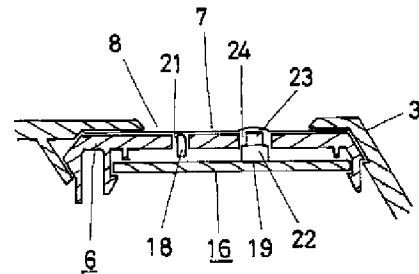
【符号の説明】

- 3 本体ケース
- 6 ユニットケース
- 7 表面シート
- 8 窓
- 16 プリント板
- 17 LCD
- 25 表面シート
- 27 切欠窓
- 32 トップカバー

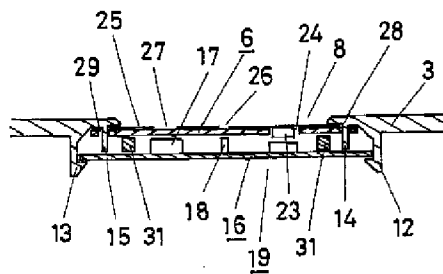
【図1】



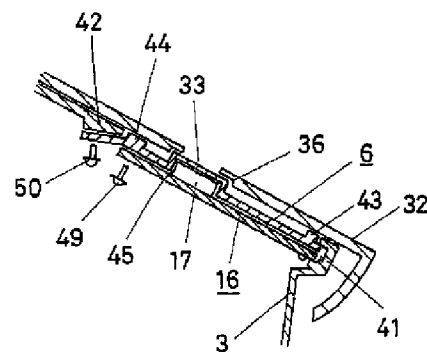
【図2】



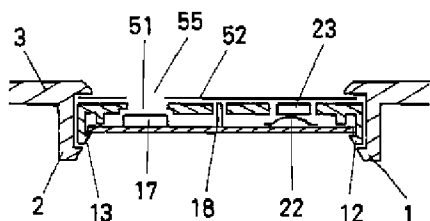
【図3】



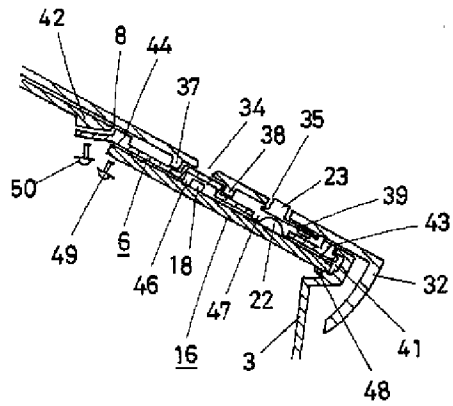
【図4】



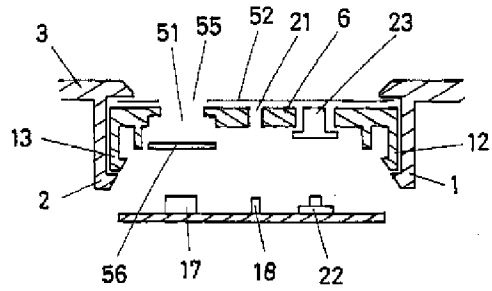
【図7】



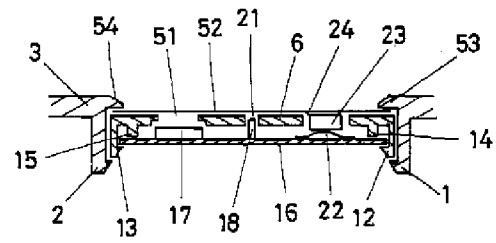
【図5】



【図8】



【図6】



【図9】

